Evaluating an ICT-Mediated Innovative Training Service from Users' Perspective. An Exploratory Case Study.

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Abstract

By the way of a case study, this paper aims at evaluating the innovative dimension of a training service mediated through Information and Communication Technology (ICT): the so-called e-WOCCQ. The originality of this article is twofold: (1) to question innovation, and (2) to consider the training more commonly as a service, whose major particularity is the implication of the user in the process. The theoretical framework emphasises on the definition of a service and on the concept of added-value. As this experience took place at the very beginning of the project development, an empirical methodology was developed. We assume that the so-called e-WOCCQ is an innovation as it represents an added value for the users. Results show that e-WOCCQ generates costs and benefits of different order, and that the ratio is influenced by factors mostly linked either with the user. Practical (improvements and targeting) and theoretical (modelisation) implications are discussed.

Introduction

By the way of a case study, this paper aims at evaluating the innovative dimension of a training service mediated through Information and Communication Technology (ICT): the so-called e-WOCCQ. The originality of this article is twofold: (1) to question innovation (how to measure it?), whilst innovation is often postulated when proposing a (new) service mediated through ICT, and (2) to consider the training more commonly as a service, whose major particularity is the implication of the user in the process (Eigler & Langeard 1987).

The theoretical framework will thus emphasise on the definition of a service (that could apply to training) and on a concept used to measure innovation: added-value. As this experience took place at the very beginning of the project development, an empirical methodology was developed.

We assume that the so-called e-WOCCQ is an innovation as it represents an added value for the users. This hypothesis will be drawn into several sub-hypotheses. Practical (improvements and targeting) and theoretical (modelisation) implications will be discussed.

1. Theory

1.1. Service's characteristics

Many authors underline the characteristics of a service in comparison with a product (Gadrey 2003, 2005; Merenne-Schoumaker 1996; Gallouj & Weinstein 1997; Hipp & Grupp 2005; Nijssen, Hillebrand, Vermeulen & Kemp 2006). The servuction principle, defined by Eigler & Langeard (1987), is probably the most famous one: it means that, in comparison to a product, a service is characterised by a broader implication of the user as a co-provider of the service.

It has been discussed (Gallouj 2003; Djellal & Gallouj 2002; Drejer 2004; Nijssen et al. 2006) whether innovation service must be considered apart from technical innovation in manufacturing activities (e.g. using specific concepts and measurements) or not (e.g. applying concepts of technical innovation to service innovation). Gallouj & Weinstein (1997) propose a comprehensive model that fits both to service and product (Fig. 1). Any product or service is a set of characteristics resulting from a combination of technical characteristics and competencies mobilised by the user and by the provider.

Applied to training, this model and the servuction approach imply that the way the training service is performed is particularly fluctuating due to the users' characteristics/competences and interactions with the provider and/or the technical characteristics (Gallouj & Weinstein 1997; Gallouj 2003; Coulon, Layole & Lepineux 2006).

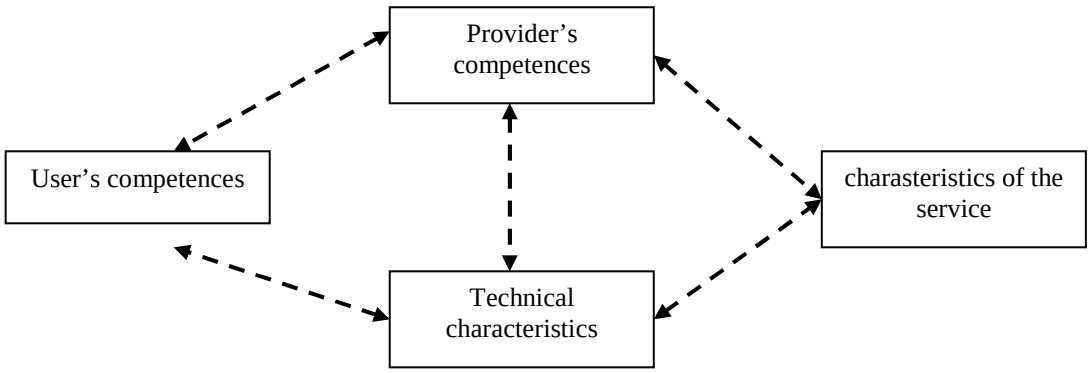

Figure 1: Representation of a service as a system of characteristics and competences (Gallouj & Weinstein 1997)

1.2. Innovation and added value

The concept of added value is commonly put forward to evaluate the innovative dimension of a product or a service in economics (Drejer 2004), sociology (Akrich 2006), marketing research (Dabholkar 1996; Galan & Sabadie 2002; Cheung & Lee 2005; Nath, Schrik & Parzinger 2001; Perrin, 2004), and pedagogy (Bonamy & Chalier 2003).

As Perrin (2004) says, any product or service is double faced: product or service value can be expressed by the mean of a ratio value/costs. Innovating means creating a service with a higher benefits/costs ratio than the previous one, by favouring benefits and/or reducing costs. However, costs and benefits can be of different orders (time, financial, social, etc.). It is impossible to rely on a common scaling unit to evaluate added value. It is thus recommended to appreciate to what extent this added value varies, and to put forwards multidimensional factors that influence costs and benefits (Perrin 2004).

2. Hypotheses

This theoretical framework leads to our 3 hypothesis: (H1) an e-service such as e-WOCCQ generates costs and benefits of different order, (H2) there are factors influencing the training service and they are linked either with the user, either with the provider, either with the technical items, and (H3) factors linked with the user are prevalent.

3. Field

This paper concerns the study of an ICT-mediated service called e-WOCCQ. It was developed by the Work Psychology Department of the University of Liège (Belgium). It is an e-learning platform that aims at teaching and

coaching professionals working in the field of job stress prevention. Different courses are proposed: how to conduct a stress information campaign in a company, how to perform stress screenings in a company, and how to develop a strategy to reduce stress at work. This study was conducted during the very first phase of the development of the platform.

4. Methodology

We used an empirical methodology, as it is very appropriate for evaluating an ongoing innovation (Karsenty 2004). Our analyses are based on a restricted number of user's (N = 10). This limitation is acceptable in an exploratory perspective. Furthermore, it is mitigated by the diversity of users: 3 had already followed a face-to-face training on the same topic and were asked to go through the online version, 7 completed the training online without having followed a similar training previously, and among those 7 users, 3 gave up the training.

Through an interview, the 4 users who completed the training and the 3 who had already followed a face-to-face training were asked: (1) what the costs and the benefits of such an e-service are (experienced and expected), (2) to point out the elements in e-WOCCQ that stimulate or restrict the service performance, which we consider to influence the benefits/costs ratio. Through an interview, the 3 users who gave up the training were asked the reasons why they did not manage to pursue.

5. Results

5.1. Costs and benefits associated with the shifts

We classified the costs and benefits reported according to 6 dimensions defined *a posteriori*. We state (Tab. 1) that some dimensions are mostly associated with benefits (control, standardization/personalisation, just-in-time knowledge), while others are mostly associated with costs (social/interaction, cognition). Time and space dimension is associated both with costs and benefits.

DIMENSIONS	COSTS EXPRESSED	BENEFITS EXPRESSED
Time and space	more time needed (N=1)	time management (N=5)
	more work at home (N=1)	just in time (N=1)
	dealing with current workload (N=1)	no moving (N=1)
Social - interactions	lack of direct feedback and mutual adjustment for an accurate understanding (N=5)	
	difficulties to come into contact with others (N=4)	
	questions asked less spontaneously (N=1)	
Cognition	mental load (N=1)	
	more exercices needed to understand (N=1)	
	knowledge applications (N=1)	
Control		at one's own pace (N=5)
		more implied, more active (N=1)
		higher control (N=1)
Standardization/ personalisation		personal support and feedbacks (N=1)
Just-in-time knowledge		more complete and structured content (N=4)

Table 1: Classification of the costs and benefits expressed by the users

Benefits associated with « control » have to do primarily with the opportunity to work at one's own pace. The deeper implication of the user in the process is also mentioned. Benefits dealing with « just-in-time knowledge » were mentioned by the users who had already followed a face-to-face training. The e-service seems to offer a more complete and structured content. Finally, one user puts forward a benefit linked to the dimension « standardization/personalisation »: a more accurate and personalised feedback and support.

The lack of « interactions » and mutual adaptations, in order to check an accurate understanding of the content, is considered to be an important cost. Another consequence is the difficulty to come into contact with others (users and/or coach), while it is very useful to share experience on that topic. Cognitive cost is also mentioned, but less insistently.

The « time and space » dimension generates costs and benefits. While personal time management and planning is underlined as a positive issue, it is to be feared the necessary time will be difficult to find out within the working frame time. It is also feared that this e-service will require more time to be taken in hands.

5.2. Factors influencing costs and benefits

Factors stimulating or restricting the training process were classified according to 3 categories: user, provider, and technical items. Factors were grouped into dimensions that are detailed below. Tables 2 and 3 present the factors mentioned by the 7 users who completed the training. When comparing those tables, one can underline 3 statements. First, most of the stimulating factors are related with the users (and/or its environment): 15 quotations out of 24 for stimulating factors, 15 quotations out of 21 for restricting factors. Second, there seems to be a fit between most dimensions. For example, the planning dimension can be either a stimulating or either a restricting factor. Third, all the dimensions might not have the same weight. For example, there is only one quotation in the planning dimension as facilitating factor, while this dimension recovers 7 quotations as a restricting factor.

The reasons given by the users who gave up are all dealing with the user's characteristics: lack of motivation, lack of prerequisites (technical and content), overloading, non appropriate learning style, and a bad perception of ICT-mediated products in general. Those 5 characteristics were simultaneously present for each of those 3 users.

TECHNICAL ITEMS (4)	USERS (15)	PROVIDER (5)
teaching method (3)	**motivation (7)**	**interactivity - feedbacks (5)**
structured table content (1)	personal motivation, challenge (3)	quickness of the feedbacks (3)
detailed video and notes (1)	being in charge of a job stress prevention project (4)	frequent contacts with the coach (2)
extra exercices (1)	**prerequisites (6)**	
ergonomics (1)	technical (4)	
easy to use (1)	content (2)	
	planning (1)	
	autonomy (1)	
	learning style (1)	
	being self-taught (1)	

Table 2: Stimulating factors in e-WOCCQ mentioned by the 7 users who have completed the training

TECHNICAL ITEMS (4)	USERS (15)	PROVIDER (2)
teaching method (3)	**prerequisites (8)**	**interactivity - feedbacks (2)**
too much time needed (3)	technical (3)	waiting for an explanation (2)
ergonomics (1)	content (5)	
mental load (1)	**planning (7)**	
	daily workload (4)	
	interruptions (3)	

Table 3: Restricting factors in e-WOCCQ mentioned by the 7 users who have completed the training

5.2.1. Users

Motivation is only perceived as a stimulating factor and seems to be important with 7 quotations out of 15 (Tab. 2). For example, considering the experience as a challenge and being in charge of a job stress prevention project make users keen on going on. *Prerequisites* are perceived either as stimulating (when they are controlled), either as restricting (when they are not controlled). Two kinds of prerequisites are quoted: content (e.g. basic information about stress) and technical (e.g. to send an email with an annexed document). *Planning* is perceived as a major restricting factor (7 quotations out of 15 in Tab. 3). Hard workload and interruptions in the professional sphere are mentioned. It is expressed that being self-taught is stimulating. Even if there is only one spontaneous quotation dealing with *learning style*, literature invited us to deepen this aspect. Indeed, researches have hypothesised the influence of the learning style on an e-learning process (Sauvé, Nadeau & Leclerc 1993). They argue that some specific learning styles fit better with e-learning than others. *Perception of ICT-mediated process* is an argument developed only by the 3 users who gave up. They feel like ICT-mediated services in general make it difficult to meet other persons, other locations and to exchange. Mallein, Brun, Cros & Favier (2004) have conducted researches on that topic. Depending on a person's sociological profile, they hypothesize a complete rejection of ICT-mediated services (or products) because they carry on values that do not meet the user's ones.

5.2.2. Provider

Interactivity and fast feedbacks from the provider are mostly experienced as a stimulating factor in the case of e-WOCCQ: 5 quotations in Table 2 and 2 quotations in Table 3. Users underlined the opportunity of frequent contacts with the provider, as well as the quickness of the feedbacks. But some could be afraid of waiting for a feedback, no matter how quick or accurate it is. Thus, this is not the provider itself that is problematic, but the characteristic of an e-service itself. Even those who gave up acknowledged that they were given a lot of feedbacks and recalls to pursue.

5.2.3. Technical Items

Technical items either stimulate or restrict the process, but for different reasons. Rich and diversified *teaching methods* seem to stimulate (Tab. 2), while too much time is required to complete the training (Tab. 3). Within the *ergonomics* dimension, usability of e-WOCCQ is put forward as a stimulating factor, while necessary efforts to get used to the technical environment are restricting.

6. Conclusion

We acknowledged the accuracy of added-value (costs/benefits ratio) as a critical dimension for evaluating the success of an innovation. Data's collected show that an ICT-mediated service such as e-WOCCQ generates costs and benefits and that it is possible to rank them according to 6 dimensions of different order: time and space, social-interaction, cognition, control, standardization/personalisation, and just-in-time knowledge (H1 confirmed). We were able to identify stimulating and restricting factors that influence the costs/benefits ratio of e-WOCCQ. They are linked either with the user, either with the provider, either with the technical items, but those linked with the user are prevalent: motivation, prerequisite, learning style, planning, and perception of ICT-mediated process (H2 and H3 confirmed).

7. Discussion

From a practical point of view, this evaluation will afford improving the service provided. Results show that some technical items and provider's performances must be either improved (e.g.: checklist of the prerequisites, planning), either enhanced (e.g.: quickness of the feedbacks). For example, a quiz is proposed when applying whose purpose is to check the prerequisites (and eventually update them). From a theoretical point of view, results are closed to the

statements of the current literature on innovation, especially in the field of service innovation: service innovation is not absolute, since it depends on the users' competencies.

However, this case study hits the limitations of an exploratory perspective, and results must be confirmed. Djellal & Gallouj (2000) recognize that preliminary exploratory and qualitative studies are very often preferred when evaluating service innovation; they afford conducting a more appropriate quantitative evaluation. Indeed, it should be possible through quantitative analysis to shape users' profile for whom e-WOCCQ is a valuable innovation (positive costs/benefits ratio), to evaluate the weight of the stimulating and restricting factors, and to test correlations between different factors (e.g.: is motivation able to compensate an inappropriate learning style). Such research tracks have already been suggested. Mallein & al. (2004) suggest testing the correlation between ICT profiles and learning styles. Dabholkar (1996) speaks for shaping the deciding factors of the perceived quality of a service. In the more specifically e-learning field, Tricot & al. (2003) postulate that factors influencing an online efficiency have a relative importance: a weaker factor can be compensated by a stronger one.

References

Akrich, M. (2006). La construction d'un système socio-technique. Esquisse pour une anthropologie des techniques. In Akrich, M., Callon, M. & Latour, B. *Sociologie de la traduction. Textes fondateurs* (pp. 109-134). Paris : Mines Paris.

Bonamy, J. & Charlier, B. (2003). Un dispositif efficace ? In Charlier, B. & Peraya, D. (Eds.). *Technologie et innovation en pédagogie : Dispositifs innovants de formation pour l'enseignement supérieur* (pp. 181-195). Bruxelles : De Boeck.

Cheung, C. & Lee, M. (2005). The Asymmetric Effect of Web Site Attribute Performance on Web Satisfaction: An Empirical Study. *e-Service Journal,3*(3), 65-86.

Coulon, A., Layole, G. & Lepineux, C. (2006). E-formation : l'heure des comptes ? Retrieved June 22, 2007, from http://www.entreprise-personnel.com/ep2006/etudes-detail.asp?EtudeId=3.

Djellal, F. & Gallouj, F. (2002). Le casse-tête de la mesure de l'innovation dans les services : enquête sur les enquêtes. *Revue d'économie industrielle, 93*(1), 7-28.

Dabholkar, P.A. (1996). Consumer Evaluations of New Technology-Based Self-Service Options : An Investigation of Alternative Models of Service Quality. *International Journal of Research in Marketing, 13*(1), 29-51.

Drejer, I. (2004). Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy, 33*, 551-562.

Eigler, P. & Langeard, E. (1987). *Servuction : le marketing des services*. Paris : Ediscience.

Gadrey, J. (2005). *L'économie des services*. Paris : La Découverte.

Gadrey, J. (2003). *Socioéconomie des services*. Paris : La Découverte.

Galan, J.-P., & Sabadie, W. (2002). *Construction of a measurement tool to evaluate the satisfaction of public service Web sites users*. Actes du 8ème Congrès International de la Londe les Maures, France.

Gallouj, F. & Weinstein, O. (1997). Innovation in services. *Research Policy, 2*, 537-556.

Gallouj, F. (2003). L'innovation dans une économie de services. In Mustar, P. & Penan, H. (eds.). *Encyclopédie de l'innovation*. Paris : Economica.

Hipp, C. & Grupp, H. (2005). Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies. *Research Policy, 34*, 517-535.

Karsenty, L. (2004). Enjeux, rôles et limites d'une approche ergonomique de la conception de produits. In Caelen, J. (sous la dir.). *Le consommateur au cœur de l'innovation* (pp. 129-146). Paris : CNRS Editions.

Mallein, P., Brun, M., Cros, M. & Favier, A. (2004). Les enjeux identitaires des technologies de l'information et de la communication : les profils d'identité située dans l'usage des NTIC. In Caelen, J. (sous la dir.). *Le consommateur au cœur de l'innovation* (pp. 147-172). Paris : CNRS Editions.

Mérenne-Schoumaker, B. (1996). *La localisation des services.* Paris : Nathan.

Nath, R., Schrick, P. & Parzinger, M. (2001). Bankers' Perspectives on Internet Banking. *e-Service Journal, 1*(1), 21-36.

Nijssen, E., Hillebrand, B., Vermeulen, P. & Kemp, R. (2006). Exploring product and service innovation similarities and differences. *International Journal of Research in Marketing, 23*, 241-251.

Perrin, J. (2004). La valeur d'un produit ou d'un service, comme résultat d'une construction sociale initiée ou constatée au sein du processus de conception. In Caelen, J. (sous la dir.). *Le consommateur au cœur de l'innovation* (pp. 43-62). Paris : CNRS Editions.

Sauvé, L., Nadeau, J. R. & Leclerc, G. (1993). Le profil d'apprentissage des étudiants inscrits dans un certificat de cycle offert à distance et sur campus : une étude comparative. *Journal of Distance Education/Revue de l'enseignement à distance, 8.2*.

Tricot, A., Plégat-Soutjis, F., Camps, J.-F., Amiel, A., Lutz, G. & Morcillo, A. (2003). Utilité, utilisabilité, acceptabilité : interpréter les relations entre trois dimensions de l'évaluation des EIAH. Environnements Informatiques pour l'Apprentissage Humain, Strasbourg, 391-402.